## DETAILED ACTION

EXAMINER'S AMENDMENT

1.   An examiner's amendment to the record appears below. Should the changes

and/or additions be unacceptable to applicant, an amendment may be filed as provided

by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be

submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview

with Mr. Timothy Trop on February 22, 2010.

The application has been amended as follows:

<u>Claim 2 is amended as follows:</u>

2 (Currently Amended).   A neutron shielding material composition

comprising a hydrogenated bisphenol epoxy represented by the following structural formula (1):
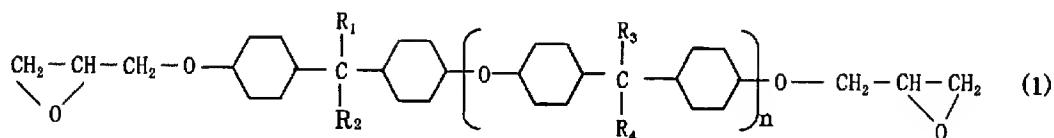
wherein each of R_1 to R_4 is independently selected from the group consisting of

CH_3, H, F, Cl and Br, and n is from 0 to 2;

a refractory material having higher density than that of the hydrogenated

bisphenol resin;

a curing agent component having at least one ring structure and a plurality of

amino groups;

a density-increasing agent having higher density than that of the refractory

material; ~~and~~

a boron compound,

wherein said neutron shielding material composition maintains the density of a

base resin comprising said curing agent component and the refractory material[[.]]<u>; and</u>
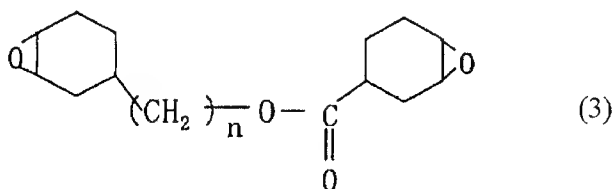
wherein density of the neutron shielding material composition is from 1.62 g/cm^3 to 1.72 g/cm^3.

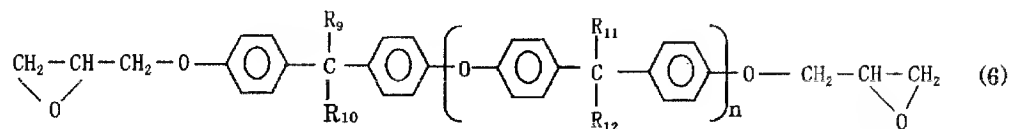## Claim 3 is amended as follows:

3 (Currently Amended).   The neutron shielding material composition according to claim 1, further comprising one or more compounds selected from the group consisting of ~~a compound~~ compounds represented by the structural formulas (2), (3), (6) and (9):

(2)
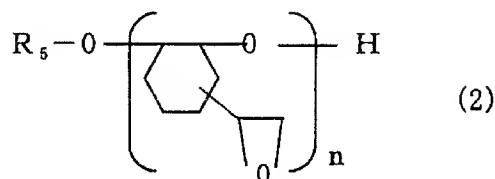
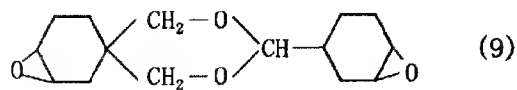wherein R_5 is a C1-10 alkyl group or H, and n is from 1 to 24;

(3)

wherein n is from 1 to 8;

(6)

wherein each of R_9 to R_{12} is independently selected from the group consisting of CH_3, H, F, Cl and Br, and n is from 0 to 2; and

(9)

<u>Claim 10 is amended as follows:</u>

10 (Currently Amended).   A neutron shielding material <u>obtained</u> ~~obtainable~~ from the neutron shielding material composition according to claim 1 or claim 2.

<u>Claim 11 is amended as follows:</u>

11 (Currently Amended).   A neutron shielding container <u>obtained</u> ~~obtainable~~ from the neutron shielding material composition according to claim 1 or claim 2.

<u>Abstract is amended as follows:</u>

Please delete the Abstract and substitute the following in lieu thereof:

A neutron shield material that exhibits high heat resistance and ensures neutron shielding capacity. A composition for neutron shield material excelling in heat resistance and ensuring neutron shielding capacity is provided by comprising a hydrogenated bisphenol type epoxy of the formula: (1) (wherein each of R_1 to R_4 is independently selected from the group consisting of CH_3, H, F, Cl and Br, and n = 0 to 2), a hardening agent component having at least one cyclic structure and two or more amino groups, a density increasing agent and a boron compound.

2.   The claims are renumbered as follows:

Claim 1 becomes claim 1.

Claim 2 becomes claim 2.

Claim 3 becomes claim 3, which depends on claim 1; reads "The neutron shielding material composition according to claim 1."

Claim 4 becomes claim 4, which depends on claim 1; reads "The neutron shielding material composition according to claim 1."

Claim 5 becomes claim 5, which depends on claim 1; reads "The neutron shielding material composition according to claim 1."

Claim 6 becomes claim 6, which depends on claim 1; reads "The neutron shielding material composition according to claim 1."

Claim 8 becomes claim 7, which depends on claim 1; reads "The neutron shielding material composition according to claim 1."

Claim 9 becomes claim 8, which depends on claim 1 or claim 2; reads "The neutron shielding material composition according to claim 1 or claim 2."

Claim 10 becomes claim 9, which depends on claim 1 or claim 2; reads "A neutron shielding material obtained from the neutron shielding material composition according to claim 1 or claim 2."

Claim 11 becomes claim 10, which depends on claim 1 or claim 2; reads "A neutron shielding container obtained from the neutron shielding material composition according to claim 1 or claim 2."

Claim 13 becomes claim 11, which depends on claim 7; reads "The neutron shielding material composition according to claim 7."

Reasons for Allowance

3.   The present claims are allowable over the "closest" prior art, namely **Hayashi** (JP 2003-066189) and **Anayama et al.** (EP 0 628 968 A1).

The broadest claim, independent claim 1, recites as follows:

1 (Previously Presented).   A neutron shielding material composition comprising:
        a hydrogenated bisphenol resin;

a refractory material having higher density than that of the hydrogenated bisphenol resin;

a density-increasing agent having higher density than that of the refractory material;

a curing agent component;

a boron compound,

wherein said neutron shielding material composition maintains the density of a base resin comprising said curing agent component and the refractory material; and

wherein density of the neutron shielding material composition is from 1.62 g/cm^3 to 1.72 g/cm^3.

According to page 16 of the present specification, the density claimed is obtained, via employing 5-40 mass percent of density-increasing agents based on the total amount of the neutron shielding material composition. The density-increasing agent is identified as metal powders (see Page 15 of the present specification). None of the references cited teaches or would have suggested a neutron shielding material composition having the claimed specific ingredients with the density of 1.62 g/cm^3-1.72 g/cm^3.

Hayashi, relied upon as the primary reference in the previous action, for example, discloses a neutron shielding material composition having **1)** a hydrogenated bisphenol resin, **2)** a boron compound, **3)** a refractory material having higher density than that of the hydrogenated bisphenol resin, and **4)** a curing agent component (Paragraphs 1, 9, and 36-37).

Hayashi does not teach or suggest forming a neutron shielding material composition having the claimed density, much less utilizing a density increasing agent, for the purpose of obtaining a neutron shielding material composition having a density.

Anayama et al., relied upon as the secondary reference in the previous action, do not remedy the deficiency in Hayashi et al.

Anayama et al. fail to mention forming the neutron shielding material composition having any particular density. In fact, it employs density-increasing agents, such as metal powders, in an amount that would not form the neutron shielding composition having the claimed density. In particular, **Anayama et al.** teach employing equal to or greater than 50 parts by weight of density increasing agent based on the total amount of the neutron shielding material composition (Page 3, lines 30-45). According to page 16 of the present specification, the use of such amount will suggest away from forming the neutron shielding material composition having the claimed density.

4.   Additional pertinent prior arts have been uncovered in further search.

Specifically, **Carden** (US 5,700,962) also teaches away from the claimed invention via forming the neutron shielding material composition having a density of 2.5-2.8 g/cm^3 containing density-increasing agents, such as metal powders (see, for example, abstract). *See In re Sebek*, 465 F.2d 904, 907 (CCPA 1972)("Where, as here, the prior art disclosure suggests the outer limits of the range of suitable values..., the determination of optimum values outside that range may not be obvious."); *See also In*

re Gurley, 27 F.3d 551, 553 (Fed. Cir. 1994)("A reference may be said to teach away

when a person of ordinary skill, upon reading the reference, would be discouraged from

following the path set out in the reference, or would be led in a direction divergent from

the path that was taken by the applicant.")

Kamoshida et al. (US 2003/0102445) teaches a neutron shielding material

containing a hydrogenated bisphenol A type epoxy resin (see, for example, abstract).

However, **Kamoshida et al.** fail to teach using other additional claimed materials, such

as refractory material, boron compound, and density-increasing agents, in forming the

neutron shielding material having the claimed density.

5.   Any comments considered necessary by applicant must be submitted no later

than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on

Statement of Reasons for Allowance."

6.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Hannah Pak whose telephone number is (571) 270-

5456. The examiner can normally be reached on Monday - alternating Fridays (7:30 am

- 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

                                        Hannah Pak
                                        Examiner
                                        Art Unit 1796

/HP/

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796